PALESTINE

DEPARTMENT OF AGRICULTURE AND FISHERIES

ANNUAL REPORT

FOR THE YEAR

1944-45

(YEAR ENDED MARCH 31, 1945)

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OF THE

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FOR THE

YEAR ENDED MARCH 31, 1945.

GENERAL SURVEY.

The most notable agricultural events of the period under review were a bumper crop of potatoes harvested in the summer of 1944, the outbreak of African horse-sickness which was brought quickly under control, and an excellent crop of barley in the south after an abnormally heavy rainfall in the winter of 1944-45. Citrus exports reached a slightly higher level but were still greatly restricted by lack of shipping facilities to the United Kingdom. The arrival of considerable numbers of tractors, ploughs, combine harvesters, and other equipment proved of great assistance to an industry still short of labour.

SECTION I.

AGRICULTURE AND FISHERIES IN PALESTINE, 1944-45.

MAJOR CROPS AND INDUSTRIES.

The Citrus Industry.

Area under Citrus.

2. The estimated citrus area at the beginning of 1944 was approximately 267,000 dunums. Some further uprooting took place during the year, but since no full grove inspection was undertaken in 1944 accurate up-to-date figures relating to the area under citrus are not available. It was, however, arranged to carry out a detailed inspection of all the groves in the early summer of 1945.

Citrus Cultivation.

3. The improved prospects of a resumption of exports in fair volume stimulated work in the groves towards the end of the year, while the supplies of nitrogenous fertilizers made available to growers early in 1945 were of much assistance. Loans at the rate of £P.5 per dunum were issued by Government in respect of some 148,000 dunums in 1944, and once again no Rural Property Tax was levied on citrus. Cultivation costs, even with the reduced standard, still remained high with an average of about £P.11 per dunum.

The Citrus Crop.

4. Following what was for war time conditions a relatively heavy crop, the 1944 bloom was satisfactory and heavy in some areas, but the fruit did not set well and when a crop estimate was made by the Fruit Inspection Service in July it was estimated that the crop on the trees would yield about 7 million cases, made up of 5½ million cases of Shamouti (Jaffa) oranges, 700 thousand cases each of Valencia oranges and grapefruit and 300 thousand cases of lemons. Records of disposal show that this estimate was fairly correct.

Export and Disposal of the Citrus Crop.

5. The following tabular statement summarises exports during the 1944-45 season (1.6.44—31.5.45):—

One Palestine Pound (£P.) — 1,000 mils = One Pound Sterling.
One Dunum (metric) — 1,000 square metres = 0.2471 acre.
Throughout this report the term "Ton" means the metric ton of 1,000 kilogrammes.

CITRUS FRUIT.	Export (Cases)	Estimated Value F.O.B./F.O.R.
	£P.	£P.
IN CASES.		
Oranges	1,582,266	1,314,784
Grapefruit	356,512	268,797
Lemons and other Citrus	54	62
Total Export in Cases. (*)	1,938,832	1,583,643
IN BULK.		
30,485 tons oranges, equivalent to:—	731,640	333,963
1,130 tons grapefruit, ,, ,,	29,380	11,085
1,901.5 tons lemons and other citrus, ,, ,,	47,537	23,603
Total Export in Bulk. (33,516.5 tons) equivalent to:—	808,557	368,651
TOTAL EXPORT IN CASES (*) AND IN BULK, equivalent to:—	2,747,389(**)	1,952,294(***)

5. Of the cased exports, the United Kingdom took nearly 1,440,000 cases and the Army authorities the equivalent of over 465,000 cases; the balance of over 34,000 cases was exported to countries in the Middle East. Of the bulk exports Syria and the Lebanon imported 17,600 tons, Egypt 7,547 tons, and Transjordan 8,088 tons.

The total cased (see Note *) and bulk exports were respectively 87 per cent. more and 40 per cent. less than in 1943-44, while the total export (in cases and in bulk) was 13 per cent. more than in 1943-44.

6. Local consumption by the civil population was estimated at about 2¼ million cases, the Army authorities placed contracts for local use equivalent to some 91,000 cases and factories utilised more than 600,000 cases in the manufacture of citrus products. Thus, out of an estimated crop on tree before the season commenced of about 7 million cases, nearly 6 million cases were disposed of, though some sales, particularly those to factories, were not really remunerative to the growers.

7. Export prices f.o.b. (excluding containers) were approximately 650 mils per case for Shamouti oranges, 765 mils for Valencia oranges, and 600 mils for grapefruit. Bulk fruit prices to neighbouring countries averaged between £P.10 and £P.13.300 mils per ton for Shamouti oranges, £P.16.300 mils per ton for Valencia oranges, between £P.8.300 mils and £P.10.400 mils per ton for grapefruit and between £P.12 and £P.12.600 for lemons. Prices realised per case on the tree were 150-200 mils per box for Shamouti oranges, 250-350 mils per box for Valencia oranges, 150-300 mils per box for grapefruit, and 200-300 mils per box for lemons. Shamouti oranges sold locally for 100-200 mils per hundred, grapefruit for 150-250 mils per hundred, Valencia oranges for 300-400 mils per hundred, and lemons for 200-300 mils per hundred, dropping to as low as 80 mils per 100 in January, 1945. Mandarines sold locally for 350-500 mils per 100.

Citrus Control and Marketing Boards.

8. A Citrus Marketing Scheme was brought into operation for the 1944-45 season.

(*) Approximately 14% of the recorded "TOTAL EXPORT IN CASES" was actually exported in sacks.

(**) Includes export by the Army up to June 30th, 1945, but excludes export by the Army of any fruit of 1943-44 crop. Includes 7,673 cases of oranges, 147 cases of grapefruit, 3,073 tons of oranges in bulk, and 35 tons of grapefruit in bulk of 1943-44 crop exported in June, July and August, 1944.

(***) Includes value of containers (cases and sacks), estimated at £P. 269,313.

The principal objects of the scheme were to secure a fair division of marketing possibilities amongst all growers, whether members of co-operative societies or not, and to fix minimum prices for fruit in cases and in bulk for sale to various destinations and for fruit for sale in bulk to factories making citrus products.

9. To operate the scheme, persons, co-operative societies and firms who wished to be exporters had to apply to the Citrus Marketing Board for provisional approval, such approval being based mainly on past trade and business standing. All growers were then asked to link their planted area for disposal of the 1944-45 crop with one of these provisionally approved exporters. An exporter was not confirmed as such unless a specified minimum area was linked with him. Growers who had linked with an exporter who was not finally confirmed were advised to re-link with one of the exporters who had qualified by obtaining the necessary linked areas. The confirmed exporters were then told to arrange themselves into 24 contracting groups (contractors)—12 Arab and 12 Jewish—to facilitate the signing of contracts for sale (where such were not made direct with the Board) and handling of orders generally. Both the Arab and Jewish contractors were asked to maintain a Liaison Office for receipt of orders for shipment, etc., from the Board and for their transmission to the various contractors and exporters, the latter being in the nature of sub-contractors. All orders were first divided equally amongst the Arab and Jewish groups (this corresponding roughly with the respective areas) and then amongst the various contractors and exporters according to their linked area of Shamouti (Jaffa) oranges, Valencia oranges or grapefruit as the case might be—except with small orders which were handled in rotation. Each exporter was responsible to the growers linked with him, with whom he had signed contracts based on a model supplied by the Board, to pay the net returns due for the quantities actually delivered, the charges and exporter's commission being fixed by the Board. The growers were safeguarded by having a Committee of Supervision with each confirmed exporter and by Boards of Arbitration. The Board operated a pool of part proceeds to effect any necessary adjustments with sales to various destinations.

10. Naturally, with the introduction of such a scheme, particularly because the Arab section of the industry is largely unorganised, some difficulties arose, but these were of a relatively minor nature and, in general, the scheme was very successful and proved of great benefit to growers, both as regards prices and division of sales.

11. Apart from operating the Citrus Marketing Scheme with the assistance of the Citrus Control Board staff, the Citrus Marketing Board dealt with the many other marketing questions, such as directing centralised purchase of packing materials and licensing of exports. The Citrus Control Board continued to deal with major problems of the industry, for example, the general principles of the marketing scheme, citrus loans, black scale control schemes, release of fertilisers, etc. The Chief Horticultural Officer continued to act as Manager of the Citrus Control Board.

Citrus Products.

12. Concentrated juice manufacture was almost entirely for export to the United Kingdom; the production of some 890 tons of orange concentrate (6 to 1 concentration) was a slight increase over the previous season's output and practically filled the quota allotted but, owing to shortage of fruit supply after meeting the requirements of the Army authorities for pasteurised juice, only 82 tons of grapefruit concentrate (4 to 1 concentration) were produced. Concentrate prices remained unchanged at 19s. per gallon c.& f. for 6 to 1 concentrate and 13s. 10d. per gallon c. & f. for 4 to 1 concentrate. The quantities of fruit utilised in products factories were the equivalent of some 450,000 cases of oranges and 180,000 cases of grapefruit, of which some 88 per cent. and 13 per cent. respectively were used for concentrate manufacture. The Army authorities placed a fairly large order for canned pasteurised grapefruit juice and the manufacture of other products was mostly of squashes, marmalades and pasteurised juice to meet civilian and military requirements locally and in nearby countries. There was no United Kingdom demand for Palestine lemon oil and no grapefruit oil was offered at the 1944 price of 17s. per lb. f.o.b.; with the much reduced price of 10s. for orange oil, only 600 kilogrammes were exported to the United Kingdom. Citrus oil exports other than to the United Kingdom totalled some 4,400 kilogrammes of orange and lemon oils; these exports

were made mostly to Egypt, Australia and Turkey with smaller quantities to other Middle East countries, India and South Africa.

Wheat.

1943-44 Season.

13. There was a substantial reduction in the area planted with wheat and estimated production declined by approximately twenty per cent. on the previous year. The cause of this decrease in production was mainly the lateness of the rains and the inability of the farmers to cultivate and sow a normal area in a very restricted period of time. It was a bad season for grazing and the weak condition of working animals increased the difficulties of ploughing. There is also no doubt that many farmers preferred to grow an alternative crop of pulses, the prices of which were not controlled. The wheat being late sown did not tiller well; it also suffered more than usual from the cereal leaf miner "ed-Duda" (*Syringopais temperatella*). The area planted was 1,400,000 dunums and the crop was estimated at 51,000 tons.

1944-45 Season.

14. The rains began at the usual time in the last quarter of 1944, but unlike any season within living memory they continued almost incessantly up to the end of April, 1945. Consequently on the heavier soils, and on mechanised farms in particular, ploughing and sowing were delayed. The wheat crops on the heavy, badly drained lands suffered some damage but these losses were to some extent offset by the excellent crops in other areas. Rust infection was negligible. The area planted was estimated to be 1,370,000 dunums and the yield at 56,000 tons.

Barley.

1943-44 Season.

15. There was a slight increase in the area under barley because it is grown on light soils and can be sown later than wheat. The area planted was 1,470,000 dunums and the crop was estimated at 35,000 tons.

1944-45 Season.

16. The barley crop in the south was well suited by the exceptional rains and a bumper yield of 44,000 tons was expected from the Beersheba and Gaza sub-districts alone. The total crop for the country is estimated at 70,000 tons from a slightly larger area than in the previous season.

Pulse Crops.

17. It is pleasing to record that there was a further increase of the areas planted with pulse crops. The growers obtained excellent yields and there has been a substantial reduction in prices. Propaganda by the Department has been directed to encouraging farmers to introduce a legume into the rotation of summer and winter cereals which is the only method available of effecting some control over the cereal leaf miner.

Vegetables.

18. The Government vegetable seedling nurseries were maintained and about ten million seedlings were produced and sold at nominal prices or issued free to schools, Police Stations, Army Camps and institutions.

19. The increased production of vegetables was stimulated and encouraged in every way possible but in the summer the total area declined. This was largely the result of the introduction of price control after the previous planting season and following the experience of over-production in the peak season. An appreciable proportion of seasonal vegetables are grown under irrigation and land and water previously used for vegetable production was diverted to the production of more profitable crops such as green fodders for feeding to cattle. Small holders and urban dwellers with small gardens grew more vegetables than usual for home consump-

tion. Unfortunately the shortage of domestic supplies of water in some of the large towns limited the scope of the family effort in vegetable production, besides prohibiting entirely the development of allotments.

20. Yields in the summer were satisfactory but some of the winter crops were spoilt by the excessive rains which, in addition, brought on a heavy infection of mildew.

21. Farmers are being encouraged to extend the seasons by planting early and late varieties and by making more use of the warmer conditions of the Jordan Valley for growing vegetables which are out of season elsewhere in the country.

22. Another good season was experienced by the vegetable seed growers who during the war have produced seed of almost every different kind of vegetable which can be grown in Palestine. As surplus stocks were available in August it was possible to reduce the production programme on the Government Farm at Acre where large quantities are held in stock. More attention is now being given to determining the kinds of vegetable seeds which can be produced and sold in competition with seeds from other countries. The quality and types of some vegetables will have to be improved considerably if an export trade in vegetable seeds is to be established. Attention is being given to improving quality and to testing new types both at the Government Farm and by the Jewish organisations.

Summer Crops.

23. In 1943 a considerable part of the millet area had to be left fallow as it could not be cultivated in time after the late rains. In 1944 it was possible to plant a normal area, an increase of some 126,000 dunums over 1943. Yields, however, were poor because there was not sufficient moisture in the soil. A smaller area than usual was planted with maize because imports of seed failed to arrive in time for planting.

Potatoes.

24. The most remarkable production of the year was an excellent crop of potatoes estimated at 35,000 tons following an import of nearly 5,000 tons of seed potatoes from the United Kingdom. In some fields yields were as high as 16 tons per acre compared with a good yield in the United Kingdom of 10 tons per acre. Attempts were made to export some 5,000 tons of surplus ware but in the end the whole crop was consumed locally.

25. Some six hundred tons of seed were bought by Government in June, stored in cold stores, and sold to Arab farmers in the autumn. Jewish farmers were able to store their requirements in the cold stores they had erected earlier in the war. The autumn crop was rather severely damaged in certain localities by excessive rains in November and December.

26. At the end of the year 1,900 tons of seed arrived from the United Kingdom. Unfortunately only a small proportion of this seed was of the Up-to-Date variety which has been proved to be the most suitable variety for local conditions. A large quantity of seed of the Kerrs Pink variety was received but the Arabs prefer a potato with a white skin, pink skinned varieties being very unpopular.

27. Considerable experimental and research work has been done on different problems connected with growing potatoes in Palestine; this work is referred to elsewhere in this report.

28. Whereas before the war only very small quantities of potatoes were produced locally this crop has now become well established in the farming system and in the diet. However, annual importations of seed are still indispensable because of the rapid rate in degeneration.

Tobacco.

29. Permits were issued to growers to allow of their planting 33,226 dunums of tobacco but the total area planted was only 28,000 dunums which yielded 1,640 tons of tobacco and 44 tons of tombac compared with 1,198 tons and 26 tons respectively in 1943.

30. The growers experienced some difficulty in selling their crop as quantities surplus to immediate requirements of local types had accumulated. Export of limited quantities by the manufacturers was permitted and some tobacco was exported to Syria, Egypt and Asmara.

Forage Crops.

31. There has been a further substantial increase in the areas planted with fodder crops on Jewish farms. As most of the cattle on these farms are stall fed a steady increase in the production of fodder is required to keep pace with the steadily expanding dairy industry. The difficulties of obtaining sufficient quantities of clover seed placed a limit on the areas which could be planted with this crop. The areas put down to artificial pastures are still negligible.

Fruits other than Citrus.

32. Interest in extending the planting of fruit trees increased, Arab farmers being mainly interested in planting olives, apples and plums and Jewish farmers in planting apples, plums and table grapes. It is estimated that private nurseries sold 13,000 budded olive trees, 78,000 budded fruit trees and 200,000 grafted vines, while departmental nurseries distributed 6,500 budded olive trees, 10,300 budded fruit trees, 22,800 grafted vines and 10,800 unbudded fruit trees.

Deciduous Fruits.

33. The mild winter of 1943-44 had an unfavourable effect on many kinds of fruit trees and especially those which require cold weather during the dormancy period. Later, the frequent sirocco winds in the spring reduced the set of fruit. Almonds gave good yields and the crop was sold at high prices. The apricot crop in the mountains and in the Tulkarm area was poor but normal crops were gathered in the Gaza and Ramleh areas; the mid-season and late varieties were severely attacked by Mediterranean fruit fly and a large proportion of the crop was picked and sent to jam factories before it matured.

34. The plum crop varied considerably according to locality and variety. Peaches were badly attacked by fruit fly and only those fruits which were protected by paper bags reached the market. Very high prices were realised for almonds and all stone fruits. Production was estimated at: almonds — 1,200 tons; apricots — 4,500 tons; and plums — 1,500 tons. Local varieties of apples gave low yields while much better yields were obtained from the introduced varieties. Pears set a heavy crop but there is a marked general deterioration in the pear orchards. Approximately 1,000 tons of apples and 70 tons of pears were placed in cold storage for sale during the winter months at retail prices ranging from 350 to 450 mils per kilogramme. Prices for pome fruits were very high. Production of pome fruits was estimated at: local varieties of apples—1,500 tons; introduced varieties of apples—2,300 tons; and pears—280 tons.

Olives.

35. Following two good seasons, the olive crop, as was anticipated, failed throughout the country and yields varied from ten to thirty per cent. of the average yield of good years; young trees which were well cultivated set better crops. Olives were picked and pressed very early in the season. Approximately 2,800 tons of oil was produced; edible oil was sold at over £P.300 per ton while industrial oil was sold at £P.150 to £P.200 per ton. Green olives were sold at 60 to 100 mils per kilogramme.

Bananas.

36. The mild weather provided favourable conditions for bananas and crops were above normal, yielding 8,100 tons of fruit. Growers received the controlled price of £P.66 per ton which was later reduced to £P.60 per ton; retail prices were 96 mils per kilogramme and, later, 90 mils per kilogramme.

Grapes.

37. The grape harvest was only fair because pests and diseases did considerable damage in some important vine growing areas. In other areas good harvests of table grapes were gathered and a record yield of 7,000 tons of wine grapes was obtained. The grape crops were sold at remunerative prices.

Sub-Tropical Fruits.

38. Fig orchards were in poor condition and gave low yields. The prevalence of fig scale in many orchards in the Ramallah and Jenin sub-districts rendered a considerable part of the crop unmarketable and on the plain, Mediterranean fruit fly caused some loss. Much larger quantities than usual were sold as fresh fruit. The crops of mangoes, avocado pears, annonas and guavas are steadily increasing and satisfactory yields were obtained. The date crop in the Gaza and Tiberias sub-districts was below normal.

Fruit Products.

39. Largely because of the very high prices realised for fresh fruit, only relatively small quantities of fruit were sent to the jam factories; for the same reason the production of dried fruit further declined.

Poultry.

40. Expansion of the poultry industry was limited by the shortage of feeding stuffs and of materials for building poultry houses. Steps were taken to encourage pedigree breeding on an adequate scale as it is certain that some of the imported breeds, particularly the White Leghorn, have deteriorated in recent years. It is the intention to raise the body weight of the local Leghorns to increase vigour.

41. The two Government hatcheries were again operated during the season and produced some 255,150 day-old chicks of the "Baladi" type for Arab farmers. In view of the incidence and spread of disease it is now doubtful whether these hatcheries should be utilised in the future.

42. The controlled marketing of eggs was abolished towards the end of the year and was followed by an immediate and substantial rise in price.

Apiculture.

43. Beekeeping is becoming still more popular and honey realises very high prices as sugar is strictly rationed. The lack of sufficient sugar for feeding bees in the off-season and difficulties in obtaining materials for hives limit the increase in this profitable sideline.

Livestock.

44. The number of cattle continues to increase by approximately 10 per cent. annually. This increase is largely confined to Jewish farms, although there has been some increase in Arab sectors. In 1942/43 it was estimated that there were 26,000 dairy cattle; the present estimate is 32,000.

45. Milk production has increased from approximately 104 million litres (including goats milk) in 1939 to 121 million litres in 1944; the increase is almost entirely attributed to Jewish production of cows' milk which is estimated at 61 million litres.

46. The Jewish cattle are largely stall fed with fodder produced on the settlements with the addition of small quantities of concentrates where there are deficiencies in home grown food.

47. The introduction and development of artificial pastures is most desirable and would effect an appreciable reduction in the price of milk and dairy products which are exorbitantly expensive compared with prices in other countries. Much time is devoted to experiments connected with fodder crops and artificial pastures, some valuable results have been obtained and practice on many settlements is now following the advice given by the Department. The establishment of artificial pastures is only practised on a very small scale, largely because farmers fear tick-borne diseases which, however, could be controlled by regular dipping. There has not been any appreciable progress towards improving the methods of grazing and feeding in the Arab villages.

48. The mania for pig keeping which was in evidence in 1943 among diverse elements of the population, from farmers to taxi drivers and from lawyers to domestic

servants, collapsed finally because of the shortage of fodder and the introduction of price control on pork and pork products. Many hopeful speculators lost heavily.

49. In September a severe outbreak of African Horse-sickness occurred. It was introduced from Egypt. Fortunately it proved possible to obtain sufficient quantities of vaccine from South and East Africa to bring the disease under effective control by the middle of November. Altogether it spread to 335 localities and resulted in the loss of some 1,500 horses and mules. Had it not been for the early arrival of vaccine the losses might have been catastrophic. Government assisted farmers by procuring as many mules as possible from Cyprus which were sold at prices much lower than those charged previously by private importers.

Agricultural Machinery.

50. By the end of March 1945 the import of agricultural machinery had reached a most satisfactory level. Among the most important imports were 289 tractors, 258 ploughs and 91 combine harvesters most of which arrived in the preceding twelve months.

Fertilizers.

51. Imports of Sulphate of Ammonia were ample for both citrus and agriculture. The local manufacture of Palestine Single Superphosphate (16% P_2O_5) was sufficient to meet the requirements of Palestine, Cyprus, Syria and the Lebanon. Supplies of Muriate of Potash were obtainable locally as required. As the result of propaganda by the Department more farmers practised composting, and certain municipalities evinced greater interest in the possibilities of converting town refuse into manure by the Boggiano-Pico process. The shortage of organic manure remains one of the most serious problems in a territory where so much of the natural manure is used as fuel.

SECTION II.

WORK OF THE DEPARTMENT OF AGRICULTURE AND FISHERIES.

Establishment of the Department at the close of the Year.

Director	— Major F. R. Mason
Deputy Director and Controller of Agricultural Production	— Mr. D. Stedman Davies
Senior Agricultural Officer	— Mr. J. C. Eyre
Chief Horticultural Officer	— Mr. A. C. Shill
Chief Plant Protection Officer	— Dr. J. E. Hardy

Agricultural Service.

52. The urgent necessity to produce the maximum quantities of the right kinds of food with the minimum imports of the essential means of production such as implements, fertilizers and irrigation equipment was the first responsibility of the agricultural service and to this work all its energies were devoted. The Deputy Director continued in his appointment as Controller of Agricultural Production and organised food production and the distribution of seeds, fertilizers, tractors, ploughs, etc.; he also advised other Controllers regarding the release of items required for agricultural production. The urgent demands of the moment stimulated the local manufacture of many implements and developed a complete self-sufficiency in vegetable seeds and other seeds which were previously imported. Single Superphosphate was manufactured locally for use in Palestine and other countries of the Middle East.

Seed Production.

53. In addition to small areas on the agricultural stations at Majdal, Jericho, Ein Arrub and Beersheba, 6,400 dunums of land were under cultivation at the Government Farm, Acre, and at Beit Qad, Nesher and Kafr Anan under the direct super-

vision of the officers in charge at the farm. These large areas of land were used for the multiplication of seed of selected wheat, barley, oats and other field crops, and for growing vegetable seeds and seedlings, for experiments and trials with different crops and methods of manuring and for providing feed for the animals and poultry.

54. Vegetable seeds of all the various types and kinds were grown on the farm from varieties which were known to be suitable through experience and from varieties which trials and experiments proved to be superior. Over nine tons of vegetable seed with a market value of £P.13,000 were produced during the year. By the controlled sale of these seeds to local merchants it was possible to maintain a constant supply of seed and to keep prices at a reasonable level. In addition large quantities became available for export but no means have been yet found for disposing of this surplus seed. The production programme was curtailed in August when it became evident that there were ample supplies of seed in the country. A cold store was built to store the large quantities of valuable seed to minimise the risk of deterioration.

55. Jewish farming interests have developed an organisation for growing vegetable seeds and they are anxious to find an export market for surplus production. They have installed a modern plant for cleaning their seed.

56. As indicated above, a large area of cultivation on lands farmed by Government was devoted to the production of selected seed of different varieties of wheat, barley and oats. Seventy-four tons of grain seed were distributed. All this seed was grown from improved strains and varieties which had been fully tested in trials. An admirable system of seed improvement has been developed on the Jewish farms and through the years there has been a steady improvement in the quality of their seed. Unfortunately there has been little or no general improvement in the quality of seed used by the more conservative Arab fellahin. The quantities of seed which are distributed to them are very soon dissipated and become mixed with inferior seed on the threshing floors. It is imperative that some means be found whereby the Arab farmers can improve and maintain the general quality of their grain seed. A start was made in one district by giving a few farmers every encouragement to become seed growers.

57. Approximately ten millions of vegetable seedlings were again distributed from the Government nurseries; this service is much appreciated by the farmers but should now be curtailed as it tends to discourage private enterprise and if for any reason the Government nurseries fail then there is a shortage of seedlings.

Investigations and Experiments.

58. Research and experimental work on the Government farms and stations has been expanded considerably during the last few years and valuable information has been acquired. The problems are numerous and it is certain that the present programme is already too over-loaded for the staff available at present. However, many of the experiments and trials were made to provide urgent information as to the best means of making the fullest use of our resources during the war; work on some other problems could not be discontinued altogether without sacrificing much valuable work done in past years.

59. The breeding, selection and trial of strains and varieties of wheat, barley and oats was continued. The various strains after adequate testing at Acre were sent to subsidiary stations and to farms for further trial under different local conditions. The work of the plant breeder in Palestine is made extremely difficult by the exceptional variety of distinctly different climates and soils and by the differing tastes in diet of the population. Nevertheless, it has been possible to provide the farmers with improved seed of a number of varieties suitable for their own conditions.

60. Attempts to grow rye in Palestine failed in the past but some seed recently imported from East Africa shows promise and may give better yields than wheat on the light, sandy soils.

61. The majority of cattle on Jewish settlements are almost exclusively stall fed whereas Arab cattle rely largely on the natural grazing which is available (including stubble grazing) supplemented by small quantities of hay from the straw of grain

crops left after threshing. An economic system of growing artificial pastures is an urgent and important requirement in local agriculture. The Jewish dairy industry which represents approximately forty per cent. of the income on many settlements will have some difficulty in surviving in the face of open competition from imports unless artificial pastures or leys are brought into the system of farming to reduce costs. After a number of years of trials and experiments a satisfactory mixture of legumes and grasses has been developed at the Government Farm, Acre, where an irrigated temporary ley of 4-5 years duration has been established. In the first year a mixture of Lucerne (Hairy Peruvian variety), Rhodes grass (*Chloris gayana*) and Paspalum grass (*Paspalum dilatatum*) are sown on manured soil. In the summer of the third year the Lucerne is dominated by the grasses and the pasture tends to become sod bound. The area is then heavily disced and sown with Egyptian clover (*Trifolium Alexandrinum*). The grasses gradually recover until they predominate and in the fifth year Ochrus vetch (*Lathyrus ochrus*) is sown. The pasture is later ploughed up and sown with a field crop; at Acre potatoes were planted and yielded 16 tons to the acre followed by 28 tons to the acre of green fodder (Pencillaria and maize). It is roughly estimated that the average cost of food consumed per litre of milk produced was reduced from 9.5 mils to 7.9 mils. Regular dipping of the cattle was practised and tick-borne diseases did not increase. The general health of the cattle was favourably affected. Fertility of the cows was markedly increased and lactation improved. This very valuable experiment has shown that temporary leys can be established and if incorporated into the farming system they should materially reduce the costs of milk production. There is, however, still a very great deal to learn concerning artificial pastures in Palestine and more particularly in regard to the best methods of grazing them.

62. A large number of experiments have been made on different problems connected with growing potatoes. It was essential to obtain this information to make the maximum use of the large quantities of seed sent from the United Kingdom. The growing of potatoes on a large scale in Palestine is a comparatively new venture and it is only in recent years that we have begun to learn something definite concerning the behaviour of this crop. Experiments confirm that, out of the numerous varieties tried, Up-to-Date and Arran Banner give satisfactory results under local conditions. Twelve different varieties grown from seed imported from the United Kingdom were tested. Up-to-Date seed was procured from six different firms and a trial of the seed indicated that there may be wide differences in yields of the same variety obtained from different firms of exporters; the seed from one firm yielded 2.11 tons per dunum while the yields from seed suppled by the other five firms ranged from 1.87 tons per dunum to 1.44 tons. A similar trial was made with Arran Banner seed, in this case the yields ranged from 2.35 tons per dunum to 1.88 tons per dunum.

63. The war time difficulties of obtaining fresh seed for planting in spring made it necessary to use locally grown seed, mainly from the autumn crop. Normally this seed is still dormant when the spring crop should be planted. Five different methods of breaking dormancy were tested; maintaining the tubers in a warm moist atmosphere for 30-60 days gave the best results but losses from rotting were heavy.

64. Special attention was given to experiments with Rose ends, including Rose ends sent from the United Kingdom. Rose ends prepared by different methods gave yields varying from 40 per cent. to 75 per cent. of the yields obtained from normal seed of the same variety and crop. The most satisfactory method of preparing Rose ends consisted in cutting the sections a fortnight before planting and burying them in moist sand. Prepared in this manner the Rose ends gave 70 per cent. of the yield obtained from whole tubers. The Rose ends received from the United Kingdom gave a yield of 40 per cent. of the crop obtained from the whole seed imported at the same time.

65. Experiments have been proceeding for a number of years to find out the manurial requirements of potatoes and the best methods of irrigating the summer and autumn crops. It is found that if potatoes take their correct place in the rotation, that is after fodder crops which have been manured, it is unnecessary to apply phosphates or potash; in fact, too heavy applications of the latter fertilizer may reduce

yields. Dressings of farmyard manure and nitrogenous fertilizers increase yields significantly. Many farmers apply superphosphate and potash to their potato crops grown on normal fertile soils; this practice is wasteful.

66. Special trials in different parts of the country have been conducted to try and elucidate the problem of the peculiarly rapid degeneration of seed potatoes in Palestine. No results of any value were obtained.

67. Egyptian clover ("Berseem mesqawi"—*Trifolium Alexandrinum*) from which five to seven cuts of fodder are taken per season plays a most important part in the economy of mixed farms. Comprehensive experiments have been made to see whether it is possible to reduce costs by eliminating unnecessary fertilizers, by sowing at the right time and by reducing the quantities of water applied. It was shown that yields are consistently increased by the use of superphosphate but that the increase in yield due to this fertilizer is far less marked when the preceding crop received organic manure. The crop did not respond to applications of inorganic nitrogen or potash. It was found that the best time for planting is in the first fortnight of October and not in September and that excessive quantities of water applied during the first period of growth reduce the yield from subsequent cuts, even when these are almost entirely rain grown.

68. The results of two seasons' trials with applications of inorganic nitrogen, potash and phosphate fertilizers applied to wheat are available. The trial has not proceeded for a sufficiently long time and the results do not justify any definite conclusions other than the clear cut result that potash is quite unnecessary. These trials do, however, emphasise the extraordinary difficulties and complexities of experimental work in Palestine.

69. Experiments have been conducted to see whether an economic increase in the yield of wheat could be obtained by giving a top dressing of sodium nitrate just before the end of the rains. Nine separate trials were made in different parts of the country. Nitrate of soda was applied at different rates and times, in six cases the dressing failed to give any significant increase in yield, in one case the increase was significant but not economic and in two cases satisfactory and economic increases resulted. In seasons of heavy rainfall and on poor soils top dressing would be justified.

Soil Conservation.

70. A more active interest is now being taken in soil conservation and the Jewish farming interests have formed a representative committee to deal with this problem and provide assistance for farmers. This department is now receiving requests for assistance which is a healthy sign of interest on the part of the public.

71. The farmers in the hilly areas of Palestine are terracing more land but they will only do this work if they are able to plant fruit trees, olives and vines on the terraced land. Arrangements have been made to increase substantially the supplies of budded olive and fruit trees in the Government nurseries for distribution to peasants.

Horticultural Service.

72. The increasing interest which is being shown in the planting of fruit trees is encouraging. Progress with the work of organising the improvement of olive oil presses and of operation conditions, which has been undertaken in recent years in collaboration with the Department of Health, was restricted because of the limited supply of necessary materials and the short pressing season. An extensive horticultural exhibit was staged at a show held at Jenin which proved of great interest to the farmers. Two "Citrus Days" for growers were held at the Sarafand Station when the results so far obtained with trials of varieties, stocks, etc., were explained. Now that many of the plantations at the Stations are maturing, it is considered that such organised visits of growers during particular crop seasons are valuable for instruction purposes.

73. The work at the eight Horticultural Stations was normal and limited additions were made to some of the plantations. Observations were continued on such problems as:— the influence of root stock on quality, yield and size of Shamouti (Jaffa) oranges and of grapefruit, distances of planting citrus trees; a general pomological

study of pome fruit varieties and introduced varieties of fruit; nematode resistance in root stocks; different methods of planting bananas; the effect of different methods of thinning banana stools on yield and quality; the differences between pollen of various male date palms; the effect of time of pruning of vines on yield, fruit quality and time of ripening; the effect of spring irrigaton of olives in areas of low rainfall; the effect of brackish irrigation water on olives; fruit suitable for non-irrigated "Loess" soils in areas of low rainfall; fruit tree planting in walled wadis in the Beersheba area; tolerance of varieties of fruit trees and vines to irrigation water with a high chlorine content; and factors contributing to chlorosis and methods of treatment.

74. Since production of nursery trees in private nurseries has not been meeting the demand and also because of the high prices charged by private nurseries, it was arranged to expand the production of nursery trees on Government Stations, at least for a period of years. The annual production of budded olives will be increased from 10 to 50 thousand trees and miscellaneous fruit trees and vines will each be increased from 20 thousand to 50 thousand. The increased output of olives will not become available for distribution until 1949, but the vines which take only a short time to produce will be ready in 1945 and fruit trees in two or three years. The increased nursery work will be undertaken at the Nablus, Majdal and Acre Stations. It is proposed that the Nablus Station should expand its olive plantings; at this Station special attention will be given to problems concerning olive culture. To avoid scattered small uneconomic plantings and to facilitate subsequent advisory work, the distribution of nursery trees in Arab areas was confined to a few selected villages in each sub-district. The villages were selected in consultation with the District Administration and, where applicable, villages taking progressive soil conservation measures were given preference. Grafted vines were distributed only in areas infected with Phylloxera and olives were distributed principally to areas where there are few plantings. The distribution of trees and vines to Jewish interests was arranged through the Fruit Growers Association and the Farmers Federation.

Fruit Inspection Service.

Grove Inspection for Loans.

75. The field work of check grove judging, begun in March, 1944, on the area of some 213,700 dunums which qualified for citrus loans in 1943 from the standpoint of condition, was completed in April. The regular staff was subsequently engaged for some time on check and appeal judging and on preparation of grove judging statistics.

General Citrus Survey.

76. The survey of groves was continued when other work permitted and 23,026 dunums, located in 17 village areas, were surveyed. The work was a revision of earlier surveys in most cases, the exceptions being certain areas which had only recently been settled by the Department of Land Settlement.

Inspection of Fruit.

77. The regular staff was fully engaged during the 1944-45 export season on inspection of cased fruit for export. 58,044 cases were rejected on inspection and re-inspection, representing over 3.9 per cent. of the total exports of cased fruit subject to inspection; rejections were chiefly from United Kingdom consignments. From mid-March until the close of the export season, inspectors of the Service assisted those of the Plant Protection Service in the necessary rigid inspection (for *Pseudococcus comstocki*) of over 900 railway truck-loads of fruit in bulk, consigned to Egypt.

Other Activities.

78. In July and August, 1944, a crop estimate was carried out by the Service, a new and more accurate method being adopted which took into account the areas in the main grove "condition groups" in each district. Miscellaneous inspections included some 1,060 visits in connection with the release of controlled materials, 80 relating to the estimation of damages, and 16 concerned with arbitration in cases of dispute over the quality of fruit exported in bulk.

Citrus Wastage Investigations.

79. The research work on citrus fruit wastage was continued in 1944-45 at the Jewish Agency Agricultural Research Station, Rehovot, along lines of work very similar to those of previous years, the principal problems under study being:— the control of fungal wastage by disinfectants, storage—particularly minimum cold storage temperature, control of *Diplodia* rot in the groves, brown rot infection, and the relative importance to growers of various diseases. Reports on this work, which is arranged by the Citrus Control Board, are submitted annually to the Board.

Plant Protection Service.

80. The farmers in Palestine are asking for more and more assistance and advice in controlling pests and diseases as their agriculture becomes more intensive. The fabulous prices which have been received for fruits and vegetables during the last year have encouraged farmers to protect their crops to the fullest extent possible, the cost of these measures of protection being negligible when compared with the saleable value of the crop. Difficulties have been experienced in meeting the demand for some fungicides and insecticides, and the shortage of spraying equipment, especially power sprayers, has been a handicap.

Research and Investigations.

81. The citrus black scale, *Chrysomphalus aonidum* Ashm. continues to be the major pest of citrus and it is believed that between 30,000 and 50,000 dunums are now infested. A proportion of the groves are suffering from widespread dieback as a result of attack by this scale and immediate measures are necessary to avoid more serious and permanent damage to the groves. It is considered that a single treatment will not be enough as the number of scales surviving will cause reinfestation in the following year. Good results were obtained with an oil spray which has been tested during the last three years. The suitable period for treatment is limited to about sixty days in the year; thus a large number of sprayers are required to treat any considerable area. The growers have become prejudiced against the use of hydrogen cyanide because of the fear of phytocidal damage caused by the gas. The results of experiments show that this prejudice is unjustified provided that fumigation is carried out when the shade temperature does not exceed 32°C. A committee of representative growers has been formed under the chairmanship of the Chief Plant Protection Officer to consider how best the limited supplies of materials and equipment can be used to obtain maximum control when a widespread campaign of control is started in the middle of the year.

82. Comstocki mealybug, *Pseudococcus comstocki* Kuw, remains established over a fairly wide area in the citrus belt. It is not causing any damage but its presence remains a serious problem because of quarantine regulations directed against it by countries which import citrus fruit from Palestine. The chalcid parasite, *Clausenia purpurea Ishii.*, is exercising control and mass liberations have been made of these parasites reared in the laboratory. However, liberations are only necessary in recently infested groves.

83. The Capnodis beetles are still taking a heavy toll of deciduous fruit trees and there is still no effective and practicable means of controlling this serious pest. A farmer who plants stone fruits takes a serious risk, as the beetles may kill a very high proportion of the trees. The number of apple orchards is increasing and as was probably inevitable, woolly aphis, *Eriosoma lanigera* Husm., is infesting the trees. It is being successfully controlled by the parasite *Aphelinus mali* Held. The addition of nicotine sulphate to alternate sprays of lead arsenate used against Codlin Moth has given a most effective supplementary control.

84. Widespread damage was again caused in wheat fields by the larvae of the moth, "ed Duda", *Syringopais temperatella* Led. The control measure advised is the introduction of a legume into the rotation of cereal crops. It is gratifying that many more farmers are adopting this practice.

85. Potato plots were sown in preliminary experiments to investigate the causes of the abnormally rapid degeneration of seed in Palestine. Surveys of these plots during

the winter showed only a few aphids, none of which was indentified as *Myzus persicae* Sulz. There were severe attacks by the cutworm *Prodenia lituria* F., on potatoes and vegetables, these insects were killed by poison bait, and better field sanitation prevented breeding.

86. An outbreak of false smut, *Graphiola phoenicis* Port., on date palms at Jericho was controlled by spraying with Bordeaux mixture.

87. Palestine was free from locusts but a locust unit was again sent to Saudi Arabia to co-operate in the general campaign supervised by the Middle East Anti-Locust Unit.

Fisheries Service.

88. The total quantity of fish landed from sea and inland waters was 4,300 tons; exceeding the previous year's catch by 1,150 tons; foreign vessels landed 52 tons. The increase in production was attributed to favourable weather conditions, an increase in the number of trawlers in operation, the expansion of the area of fish ponds and to "Lampara fishing" (with lights) by which methods 450 tons of fish were produced. Although total production was increased by approximately 40 per cent., the demand still greatly exceeded the supply and prices continued at a very high level.

89. There was a small decrease in the total amount of processed fish imported; Turkey remained the principal source of supply.

Trawling.

90. The number of trawling vessels was increased to 45, an increase of fifty per cent. over the previous year, while the landings for the same period rose to 929 tons, an increase of over 60 per cent. During the year three trawlers were lost through fire and bad weather and a fourth was driven ashore.

Aqaba Fisheries.

91. The Aqaba fishery scheme was brought to a standstill by the breakdown of the engine of the M.V.S. "Doron" in the middle of the year. The vessel was completely overhauled and repaired, the cold storage plant at Aqaba completed and in March the scheme was once more in operation. Experience indicates that provided the mother ship gives satisfactory service it should be possible to deliver 35 to 40 tons of fish monthly. The services of the vessel "Forerunner" were dispensed with at Aqaba and she commenced patrol and inspection work along the Mediterranean coast to assist in the prevention of fish bombing and to do experimental work.

Lake Tiberias.

92. There was little change in the quantity of fish landed from Lake Tiberias and Lake Huleh. Stringent restrictions and patrolling are still necessary to prevent fish bombing and the catching of undersized fish. The small increase of twenty four tons in the total catch was due to an extension of the "Mubattan" method of catching fish whereby 86 tons were caught compared with 64 tons in the previous year.

Fish Ponds.

93. The large expansion made in carp breeding during the year is indicated by the rise in production to 847 tons compared with 442 tons in the previous year. This was due to an increase in the total area of fish ponds, now 6,000 dunums, and to experience gained by the fish breeders. Three hundred kilogrammes of carp fingerlings were successfully transported to Cyprus for experiments in carp breeding in that country.

Sponge Fishery.

94. An exclusive licence was granted to a local firm for sponge fishing. The firm is making preparations and experiments to exploit the sponge fishery along the coast between Haifa and Ras En-Naqura.

Research.

95. Limited research work in Lake Tiberias was continued. Mallaha experimental station remained under the care of the Agricultural Service.

96. Security restrictions prevented extensive research in the Mediterranean but useful information regarding the movement of Sardyna shoals was acquired.

Agricultural Education.

97. The Kadoorie Agricultural School, Mount Tabor (Jewish) completed another normal and successful year, the students attaining a satisfactory standard both in studies and practical work. At the end of the year under review there were 50 students in residence of whom 28 were in their first year and 22 in their second and final year. In August, 1944, the 24 second year students were all successful in passing their final examinations and were granted diplomas. The demand for training far exceeds the capacity of the school; sixty candidates sat for the entrance examination but there were vacancies for only twenty eight of them.

98. On the hilly school farm efforts were continued to prevent soil erosion by adopting a three year soil building rotation, ploughing on contours, filling in gullies, constructing terraces in the hills and by planting forest and fruit trees. Farmers who organised excursions to the school to study soil conservation methods were given help and advice. The school staff took part in a number of farmers' meetings, lecturing and advising on different agricultural problems.

99. The total yields from field crops were average and crops did not suffer a great deal from the excessive rain because there is good natural drainage on the farm.

100. The vegetable garden and the horticultural and forestry sections were satisfactorily maintained. A large number of forest and ornamental trees were planted on the farm and 3,000 were distributed to Arab and Jewish schools and villages.

101. The small dairy herd continued to thrive and consisted of a pure bred Friesian bull and cows which are cross-breds between Friesian and Damascus and Beyrout, and local Arab breeds. Experiments in cross-breeding between the local Awazi sheep and the Karakul breed were continued.

102. During the year the direction and administration of the Kadoorie Agricultural School, Tulkarm, (Arab) passed to the Department of Education. The principal function of the School is now the training of teachers in agricultural subjects.

SECTION III.

LEGISLATION.

103. No legislation of importance to agriculture or fishing was enacted during the year.

F. R. MASON

Director of Agriculture and Fisheries.

Jerusalem,

22nd October, 1945.

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